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10/633,624	08/05/2003	Takashi Kurumisawa	116485	5362

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EXAMINER	
BODDIE, WILLIAM	

ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 11/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/633,624	KURUMISAWA ET AL.	
	Examiner	Art Unit	
	William Boddie	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In an amendment dated, September 8th, 2006, the Applicant amended claims 1, 5 and 7-11. Currently claims 1-2 and 4-11 are pending.

Response to Arguments

2. Applicant's arguments filed September 8th, 2006 have been fully considered but they are not persuasive.

3. On page 11 of the remarks, the Applicant traverses the rejection of independent claims 1, 7, and 10-11. Specifically the Applicant argues that by combining the proposed resolution conversion device of Wu with the viewing angle adjustment device of Greier, the combination would render the device of Greier unsuitable for its intended purpose.

The Examiner respectfully disagrees. The Applicant has failed to show why converting the resolution of incoming video data and subsequently altering the data to allow for wider view angles as proposed in the rejection would not be possible. As currently construed the combination is seen as obvious and possible without destroying the Greier reference. As such the rejection is seen as proper and is maintained.

4. On page 11 of the remarks, the Applicant traverses the rejection of independent claims 5, 8 and 9. Specifically the Applicant argues that Hughes fails to disclose "setting the grayscale value of each sub pixel of one pixel to a different gray scale value than the other sub pixels of the one pixel."

The Examiner respectfully disagrees. Hughes is quite clear on this aspect in the disclosure. The Applicant is once again pointed to column 4, lines 28-30 which clearly

state, "additionally, each pixel may be divided into subpixels of different or similar area, and each subpixel addressed with different levels of grayscale." Also note the final sentence in the abstract of Hughes, which states, "the relative intensity between adjacent subpixels may be adjusted." As such the rejection is seen as proper and is maintained.

5. Also on page 11, the Applicant argues that the prior art does not teach the newly added limitation of each independent claim.

For discussion further discussion regarding the newly added limitations please see the appropriate claim rejections below.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, 4 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greier et al. (US 6,801,220) in view of Wu (US 6,392,642) and further in view of Kim et al. (US 5,877,737).

With respect to claim 1, Greier discloses, an image display device, comprising: a display unit, a viewing angle range adjustment device that sets grayscale values of each pixel of image data so that the grayscale values of each pixel differs from an adjacent pixel in a vertical direction or in a horizontal direction of image data (for the purposes of claim analysis the terms 'grayscale values' and 'luminance' are considered

linked, i.e. different grayscale values are akin to different luminance values; [applicant uses the terms interchangeably para. 56-57]. col. 13, lines 11-32, also note the checkerboard pattern of luminance in fig. 20), and a display device for displaying the image data on the display unit (112 in fig. 3).

Greier does not expressly disclose, a resolution conversion device that makes image data for a plurality of pixels from original image data for each pixel and generates resolution-converted image data including the image data of the plurality of made pixels,

the display device displays the original image data on the display unit if the original image data has a number of pixels corresponding to a number of displayed pixels; and

the resolution conversion device makes image data if the original image data has a number of pixels lower than the number of display pixels.

Wu discloses, a resolution conversion device (fig. 6) that makes image data for a plurality of pixels from original image data for each pixel and generates resolution-converted image data including the image data of the plurality of made pixels (Wu makes image data by oversampling the original image data, creating a plurality of pixels from the original data, col. 4, lines 32-50),

a display device (52 in fig. 6) displays the original image data on the display unit if the original image data has a number of pixels corresponding to a number of displayed pixels (there is inherently a native resolution for the display, when that resolution is inputted Wu's pixel clock will be set so as to not make any new pixels, and display the original image); and

the resolution conversion device makes image data if the original image data has a number of pixels lower than the number of display pixels (col. 4, lines 32-50; if there is less pixels than in the screen Wu increases the pixel clock to make additional data).

At the time of the invention it would have been obvious to one of ordinary skill in the art to convert the incoming video signals of Greier, to automatically adjust the resolution of the data as taught by Wu, and then adjusting the subpixel luminances as taught by Greier.

As to newly added limitation requiring that the resolution conversion be performed prior to adjusting the viewing angle, this order of processes is seen as both obvious and required by the combination of devices. The resolution conversion process essentially introduces additional data by increasing the sampling rate of the video signal as it enters the device. Greier's device, however, manipulates the grayscale of each pixel to produce a specific pattern of grayscales amongst the pixels (see figs. 13-21).

If rows of the grayscale pattern were oversampled the pattern would not bear out as required by Greier. As such it would have been obvious to one of ordinary skill in the art that the resolution conversion process must occur prior to instilling a wider viewing angle in the display data.

The motivation for doing so would have been to correctly sample the video signals without requiring manual adjustment by the user (Wu; col. 2, lines 25-33).

Neither Greier nor Wu expressly disclose, what occurs in a case that a vertical observation direction to a surface of the display unit is a 0 degree observation direction; the viewing angle range adjustment device sets grayscale value of one of the pixel and

the adjacent pixel based on display characteristics of a -30 degrees observation direction and sets grayscale value of the other one of the pixel and the adjacent pixel based on display characteristics of a +30 degrees observation direction.

Kim discloses, in a case that a vertical observation direction to a surface of the display unit is a 0 degree observation direction; the viewing angle range adjustment device sets grayscale value of one of the pixel and the adjacent pixel based on display characteristics of a -30 degrees observation direction and sets grayscale value of the other one of the pixel and the adjacent pixel based on display characteristics of a +30 degrees observation direction (col. 2, lines 14-27, discloses selecting two sets of grayscale values based on producing a widened viewing angle characteristic.)

While Kim does not expressly disclose that a +30 viewing angle characteristic is specifically used in the case of a 0 degree observation direction, this viewing angle is seen as, included in the widened viewing angle disclosed by Kim, as well as an optimum range when selecting a max/min-viewing angle. This angle being optimum it would have been an obvious selection for use in Kim's display.

Wu, Kim and Greier are all analogous art because they are from the same field of endeavor namely, matrix displays and methods of displaying data.

At the time of the invention it would have been obvious to one of ordinary skill in the art to select the gray scale values of Greier and Wu, as taught by Kim.

The motivation for doing so would have been to visually combine the viewing angles so they widen an overall viewing angle of the display (Kim, col. 2, lines 20-23).

Therefore it would have been obvious to combine Greier with Wu and subsequently with Kim for the benefit of effectively displaying low-res data on a high-res screen and widening viewing angles to obtain the invention as specified in claim 1.

With respect to claim 2, Greier, Kim and Wu disclose, the image display device according to claim 1 (see above).

Greier further discloses, the viewing angle range adjustment device setting the difference between grayscale values of the adjacent pixels in the vertical direction to be more than a predetermined grayscale value (col. 18, lines 55-58, discusses determining an ideal difference between grayscale values).

With respect to claim 4, Greier, Kim and Wu disclose, the image display device according to claim 1 (see above).

Greier further discloses, the viewing angle range adjustment device comprising: a lookup table that stores the display characteristics of the display unit (col. 15, lines 12-14), and a device that determines the grayscale value of each pixel with reference to the lookup table (col. 15, lines 14-26).

With respect to claim 10, as claim 10 is simply a method version of claim 1 and offers no new limitations over claim 1, claim 10 is rejected on the same merits as recited above in the rejection of claim 1.

With respect to claim 11, as claim 11 is simply a computer program method version of claim 1 and offers no new limitations over claim 1, claim 11 is rejected on the same merits as recited above in the rejection of claim 1.

8. Claims 5-6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greier et al. (US 6,801,220) in view of Hughes (US 5,905,482) and further in view of Amagami et al. (US 5,402,149).

With respect to claim 5, Greier discloses, an image display device, comprising:

a display unit (fig. 5);

a viewing angle range adjustment device that sets grayscale values of each pixel of image data so that the grayscale values of each pixel differs from an adjacent pixel in a vertical direction or in a horizontal direction of image data (for the purposes of claim analysis the terms 'grayscale values' and 'luminance' are considered linked, i.e. different grayscale values are akin to different luminance values [applicant uses the terms interchangeably para. 56-57]. col. 13, lines 11-32, also note the checkerboard pattern of luminance in fig. 20), and

a display device for displaying the image data on the display unit (112 in fig. 3); wherein each pixel has sub pixels corresponding to a plurality of colors (fig. 20, one pixel comprises 3 subpixels R,G and B); and

the viewing angle range adjustment device adjusts a viewing angle range for each color of the plurality of colors by setting the grayscale value of one sub pixel of the sub pixels to a different grayscale value than the other sub pixels (note fig. 20 where one subpixel in every pixel has a different grayscale than the other subpixels).

Greier does not expressly disclose, that each subpixel of a pixel is set to a different value than other subpixels of the pixel.

Hughes discloses, applying different gray scale values to each subpixel of a pixel (col. 4, lines 28-30).

At the time of the invention it would have been obvious to one of ordinary skill in the art to apply the gray scales to the subpixels of Greier, as taught by Hughes.

The motivation for doing so would have been to provide a subpixel of small dimensions (Hughes; col. 4, lines 31-33).

Neither Hughes nor Greier expressly disclose, a resolution conversion device that makes image data for a plurality of pixels from original image data for each pixel and generates resolution-converted image data including the image data of the plurality of made pixels.

Amagami discloses, a resolution conversion device that makes a plurality of pixels from each pixel of original image data and generates resolution-converted image data including the plurality of made pixels (note fig. 46, which discloses a resolution conversion with new pixels being formed from the original data).

Amagami, Hughes and Greier are all analogous art because they are from the same field of endeavor namely, matrix displays and methods of displaying data.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the driver of Greier and Hughes with the resolution conversion driver of Amagami which would then pass the resolution converted data to the wider viewing angle means of Greier and Hughes.

As with the above rejection of claim 1, the limitations requiring that the resolution conversion be performed prior to adjusting the viewing angle, this order of

processes is seen as both obvious and required by the combination of devices. The resolution conversion process essentially introduces additional data by increasing the sampling rate of the video signal as it enters the device. Greier and Hughes' device, however, manipulates the grayscale of each pixel to produce a specific pattern of grayscales amongst the pixels (see figs. 13-21).

If rows of the grayscale pattern were oversampled the pattern would not bear out as required by Greier and Hughes. As such it would have been obvious to one of ordinary skill in the art that the resolution conversion process must occur prior to instilling a wider viewing angle in the display data.

The motivation for doing so would have been to enable display of both low-resolution and high-resolution data on a high-resolution screen (Amagami, col. 1, lines 16-25).

Therefore it would have been obvious to combine Greier with Hughes and subsequently with Amagami for the benefit of creating a seemingly smaller sub-pixel and effectively displaying low-res data on a high-res screen to obtain the invention as specified in claim 5.

With respect to claim 6, Greier, Hughes and Amagami disclose, the image display device according to claim 5 (see above).

Greier further discloses, each subpixel corresponding to each color of R, G and B (fig. 20), the viewing angle range adjustment device comprising: a lookup table that stores display characteristics of the display unit for each color of R, G, and B; and a device that determines the grayscale values of the sub pixels for each color with

reference to the lookup table (col. 19, lines 37-40, which details operations based on stored RGB values).

With respect to claim 8, as claim 8 is simply a method claim and offers no new limitations over claim 5, claim 8 is rejected on the same merits as recited above in the rejection of claim 5.

With respect to claim 9, as claim 9 is simply a computer program method claim and offers no new limitations over claim 5, claim 9 is rejected on the same merits as recited above in the rejection of claim 5.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greier et al. (US 6,801,220) in view of Wu (US 6,392,642).

With respect to claim 7, Greier discloses, an image display device, comprising:

a display unit having a plurality of display pixels;

a viewing angle range adjustment device that sets grayscale values of each pixel of image data so that the grayscale values of each pixel differs from an adjacent pixel in a vertical direction or in a horizontal direction of image data (for the purposes of claim analysis the terms 'grayscale values' and 'luminance' are considered linked, i.e. different grayscale values are akin to different luminance values [applicant uses the terms interchangeably para. 56-57]. col. 13, lines 11-32, also note the checkerboard pattern of luminance in fig. 20), and

a display device for displaying the image data on the display unit (112 in fig. 3) ; wherein each pixel has sub pixels corresponding to a plurality of colors (fig. 20, one pixel comprises 3 subpixels R,G and B); and

the viewing angle range adjustment device adjusts a viewing angle range for each color of the plurality of colors by setting the grayscale value of one sub pixel of the sub pixels to a different grayscale value than the other sub pixels (note fig. 20 where one subpixel in every pixel has a different grayscale);

an input unit that receives a command to select one of a wide viewing angle range and a narrow viewing angle range, the display device displays the image data adjusted by the viewing angle range adjustment device if the wide viewing angle range mode is selected and displays the image data not adjusted by the viewing angle range mode if the narrow viewing angle mode is selected (col. 10, lines 1-3, states the user is allowed to chose the viewing angle range).

Greier does not expressly disclose, a resolution conversion device that makes image data for a plurality of pixels from original image data for each pixel and generates resolution-converted image data including the image data of the plurality of made pixels,

the display device displays the original image data on the display unit if the original image data has a number of pixels corresponding to a number of displayed pixels; and

the resolution conversion device makes image data if the original image data has a number of pixels lower than the number of display pixels.

Wu discloses, a resolution conversion device (fig. 6) that makes image data for a plurality of pixels from original image data for each pixel and generates resolution-converted image data including the image data of the plurality of made pixels (Wu

makes image data by oversampling the original image data, creating a plurality of pixels from the original data, col. 4, lines 32-50),

a display device (52 in fig. 6) displays the original image data on the display unit if the original image data has a number of pixels corresponding to a number of displayed pixels (there is inherently a native resolution for the display, when that resolution is inputted Wu's pixel clock will be set so as to not make any new pixels, and display the original image); and

the resolution conversion device makes image data if the original image data has a number of pixels lower than the number of display pixels (col. 4, lines 32-50; if there is less pixels than in the screen Wu increases the pixel clock to make additional data).

Wu and Greier are analogous art because they are from the same field of endeavor namely, matrix displays and methods of displaying data.

As with the above rejection of claim 1, the limitations requiring that the resolution conversion be performed prior to adjusting the viewing angle, this order of processes is seen as both obvious and required by the combination of devices. The resolution conversion process essentially introduces additional data by increasing the sampling rate of the video signal as it enters the device. Greier and Hughes' device, however, manipulates the grayscale of each pixel to produce a specific pattern of grayscales amongst the pixels (see figs. 13-21).

If rows of the grayscale pattern were oversampled the pattern would not bear out as required by Greier and Hughes. As such it would have been obvious to one of

ordinary skill in the art that the resolution conversion process must occur prior to instilling a wider viewing angle in the display data.

At the time of the invention it would have been obvious to one of ordinary skill in the art to convert the incoming video signals of Greier, to automatically adjust the resolution of the data as taught by Wu, and then adjusting the subpixel luminances as taught by Greier.

The motivation for doing so would have been to correctly sample the video signals without requiring manual adjustment by the user (Wu; col. 2, lines 25-33).

Therefore it would have been obvious to combine Greier with Wu for the benefit of effectively displaying low-res data on a high-res screen and widening viewing angles to obtain the invention as specified in claim 7.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gormish (US 6,043,802) discloses an image display device that first converts the resolution of incoming data and subsequently alters the grayscale performing contrast enhancement and gamma correction (fig. 3).

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William Boddie whose telephone number is (571) 272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Wlb

5/23/06

AMR A. AWAD
SUPERVISORY PATENT EXAMINER